

## **REMARKS**

Applicants believe that the foregoing amendments to the claims, specification and drawings, as well as the comments that follow will convince the Examiner that the  
5 rejections provided in the December 4, 2003 Office Action have been overcome and should be withdrawn.

### **I. THE INVENTION**

The invention of the subject application relates to a  
10 vacuum cleaner which generates a low pressure region through use of a toroidal vortex nozzle. The low pressure region can be used to remove debris from surfaces. The nozzle creates the low pressure region by forcing air to follow a smoothly curved path. As the air follows the  
15 curved path, the low pressure region is created adjacent to the curved air flow. Importantly, the toroidal vortex nozzle has to have a controlled curvature for fluid to flow around and must be sealed so that no outside fluid enters and no inside fluid leaves.

20 The toroidal vortex nozzle utilizes two tubes through which air continuously circulates in a concentric fashion. The inner tube is thickened to provide a curved surface over which air follows a smooth path, described as the Coanda effect. Air passes from an air delivery duct, over

the curved surface described by the inner tube and into the air return duct. As the air flows over the curved surface, a low pressure region is created adjacent to the curved air flow. Dust or debris contained within this low pressure  
5 region will enter the air flow and thus be removed from the environment.

The dust and debris laden air enters a dust separator. The air is forced into a vortex by both an impeller and the curvature of the dust separator walls. The dust separator  
10 acts as a centrifuge, spinning the heavier dust and debris outward where it is collected. The higher pressure in the dust separator created by the spiraling air pushes the air inward. The air exits the dust separator and passes  
15 through the air delivery duct, returning through the toroidal vortex nozzle. Any fine particulates that were not removed will remain within the air flow and be carried into the dust separator again after passage through the  
20 vortex nozzle. In this manner, air may be repeatedly passed through the dust separator and debris removed to a higher degree.

## II. THE EXAMINER'S OBJECTIONS

The Examiner objected to the drawings under 37 CFR 1.84(p)(5) for not showing every reference sign mentioned

in the description. Specifically, Fig. 1 did not include the reference signs 104, 105 and Fig. 20 did not include the designations "a" and "b." The Examiner also objected to the drawings under 37 CFR 1.84(p)(4) because several reference characters were used to indicate multiple limitations. Specifically, 402 was used in Fig. 4 to refer to a coanda nozzle and an output nozzle, 501 was used in Fig. 5 to designate a straight fashion and stray air, 604 was used in Fig. 6 to designate both a coanda nozzle and annular curved surface, 2205 was used in fig. 22 to designate both a collector and a chamber, 2317 was used in fig. 23 to designate both a canister housing and a vacuum cleaner housing, 2315 was used in Fig. 23 to designate both a motor and a hosing, 2501 was used in Fig. 25 to designate both side by side and end view, 2502 in Fig. 25 was used to designate both Siamese twin and side view, and 2503 Fig. 25 was used to designate both concentric and top view. Further, the specification was objected to for various informalities.

### III. THE EXAMINER'S REJECTIONS

#### A. 35 U.S.C. §112

Initially, the Examiner objected to claims 1-53 under 35 U.S.C. §112 as being indefinite. Specifically, the Examiner stated that the following things were unclear: (1) what is meant by a "canister-style vacuum cleaner housing,"  
5 (2) the structural relationship of the elements in claim 1, (3) where the nozzle was hinged in claims 7 and 28, (4) where the hose is located in claims 8-9, 11-15, 29, and 31-36, (5) the definitions of the hose configurations in claims 11-13 and 31-33, (6) the location of the handle in  
10 claims 16 and 37, (7) the location of the trap in claims 21 and 41, (8) the definition of "upright-style vacuum cleaner" in claim 22 and various other informalities.

**B. 35 U.S.C. §102**

Further, the Examiner rejected claims 1, 8-11, 14-16,  
15 20, 22, 27-28, 37 and 40 under 35 U.S.C. §102(b) as being anticipated by Ehnert, US. Pat. No. 4,884,315 (hereinafter "Ehnert"). Additionally, the Examiner has rejected claims 1, 8-11, 14-21, 42, 46, 48, and 53 under 35 U.S.C. §102(b) as being anticipated by McCord, U.S. Pat. No. 2,226,630  
20 (hereinafter "McCord"). Also, claims 22 and 38-39 have been rejected by the Examiner under 35 U.S.C. §102(b) as being anticipated by German Pat. No. DE661573.

**C. 35 U.S.C. §103**

Claims 2-3 and 23-24 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Ehnert in view of Self, U.S. Pat. No. 4,243,178 (hereinafter "Self"). Claims 4-5 and 25-26 have been rejected under 35 U.S.C. §103(a) as  
5 being unpatentable over Ehnert in view of Takemoto, U.S. Pat. No. 6,324,722 (hereinafter "Takemoto"). Claims 7 and 13 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Ehnert in view of Canadian Pat. No. CA972510. Claims 29-31 and 34-36 have been rejected under  
10 35 U.S.C. §103(a) as being unpatentable over Ehnert in view of Inoue et al., U.S. Pat. No. 5,930,864 (hereinafter "Inoue"). Claim 41 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Ehnert in view of McCord. Claims 6 and 12 have been rejected under 35 U.S.C.  
15 §103(a) as being unpatentable over Ehnert in view of knowledge known in the art.

Further, claims 2-3 have been rejected under 35 U.S.C. §103(a) as being unpatentable over McCord in view of Self. Claims 4-5 have been rejected under 35 U.S.C. §103(a) as  
20 being unpatentable over McCord in view of Takemoto. Claims 7, 13 and 45 have been rejected under 35 U.S.C. §103(a) as being unpatentable over McCord in view of CA972510. Finally, Claims 12, 44, 47 and 49-52 have been rejected

under 35 U.S.C. §103(a) as being unpatentable over McCord in view of knowledge known in the art.

IV. **THE EXAMINER'S OBJECTIONS AND REJECTIONS SHOULD BE**  
5 **WITHDRAWN**

**A. Drawing and Specification Objections**

The Examiner objected to the drawings under 37 CFR 1.84(p)(5) and 37 CFR 1.84 (p)(4) for not showing every reference sign mentioned in the description and for using  
10 the same reference indicator to designate multiple elements. Applicants direct the Examiner to amended figures 4, 10, 16, 20A, 20B, 21A, 21B, 23, and 25B. Therein, Applicants have disclosed each and every feature required by the Examiner. Reference 410 has been added to  
15 figure 4. Reference 1003 has been removed from figure 10. The arrows indicating reference 1602 have been moved to more specifically indicate the referenced element in Fig. 16. The figure letters in figures 20A and 20B have been changed to coincide with references to the figures in the  
20 specification. The figure letters in figures 21A and 21B have been changed to coincide with references to the figures in the specification. In figure 23, the reference numbers 2318 and 2320 have been changed to reference the container and the hose coupling respectively. The

reference numbers 2506, 2507 and 2508 have been added to figure 25B to refer to an end view, top view and side view respectively. The specification has been amended to properly reference the drawings. Replacement drawings have  
5 been submitted to appropriately renumber drawing elements in light of the above changes.

Regarding the Examiner's comments concerning Figure 10, the figure does not depict prior art but rather a vacuum system with an air flow opposite of the present  
10 invention and that achieves less than optimal results in comparison to the present invention. Applicants draw the Examiner's attention to Page 27, line 13 of the specification, which discusses the less than optimal results of this design.

15 Regarding the Examiner's comments directed to the use of the term "inner donut" on Page 24, line 6 and Page 35 lines 10-11, for clarification Applicants suggest that the "inner donut" and "inner tube" are different. The "inner donut" is integral to the creation of the Coanda effect and  
20 may or may not further define the "inner tube" with its structure.

#### **B. 35 U.S.C. §112 Rejections**

In response to the Examiner's rejection of Claim 1 under 35 U.S.C. §112, Applicants respectfully suggest that

the Examiner's rejection is misplaced. The Examiner stated that it is unclear as to the structural relationship of the elements to each other. However, lines 4-6 of Claim 1 state that a canister toroidal vortex vacuum cleaner is first comprised of a canister-style vacuum cleaner housing. As such, the claim language is definite with respect to these claim elements.

In response to the Examiner's rejection of Claim 22 under 35 U.S.C. §112 as indefinite, Applicants respectfully suggest that the Examiner's rejection is misplaced. Specifically, lines 3-5 of Claim 22 state that an upright-style vacuum cleaner is first comprised of an upright-style vacuum cleaner. As such, the claim language is definite with respect to these claim elements.

In response to the Examiner's rejection of Claim 42 under 35 U.S.C. §112 as indefinite, Applicants respectfully suggest that the Examiner's rejection is misplaced. Specifically, the source of the vacuum is the fluid flow. As such, the claim language is definite with respect to these claim elements.

Regarding the Examiner's rejection of Claims 11-13 and Claims 31-33, Applicants respectfully suggest that the Examiner's rejection is misplaced. The definitions of a "side-by-side" hose configuration, "siamese twin" hose



configuration, and "concentric" hose configuration are provided in the specification at Page 43, lines 10-11 and in Figure 25A.

In response to the Examiner's rejection of Claim 22,  
5 Applicants have amended the paragraph in the specification beginning at Page 18, line 22 to further define "upright-style vacuum". However, Applicants respectfully submit that the remainder of the Examiner's rejection is misplaced. Specifically, lines 3-5 of Claim 22 state that  
10 a toroidal vortex vacuum cleaner is first comprised of an upright-style vacuum cleaner housing, provided with a fluid delivery means and a separation means disposed therein. As such, the claim language is definite with respect to these claim elements.

15 In regards to the Examiner's rejection of Claim 42, Applicants respectfully submit that this rejection is misplaced. Applicants direct the Examiner's attention to Page 2, line 18 of the specification which explains that the "toroidal vortex nozzle" is the vacuum source.

20 Regarding the Examiner's rejection of claim 46 under 35 U.S.C. §112 as indefinite, Applicant's respectfully submit that this rejection is misplaced. The impeller is an additional limitation of the claim.

Regarding the Examiner's rejection of claim 47 under 35 U.S.C. §112 as indefinite, Applicant's respectfully submit that this rejection is misplaced. The centrifugal pump is an additional limitation of the claim.

5        Regarding the Examiner's rejection of claim 48 under 35 U.S.C. §112 as indefinite, Applicant's respectfully submit that this rejection is misplaced. The propeller is an additional limitation of the claim.

Applicants have amended the specification to add  
10 proper references to related U.S. applications and issued patents. As well, changes to the specification have been made to correct minor errors. No new matter has been added.

#### **C. Double Patenting**

15        Regarding the Examiner's potential objection to claims 2, 23, 44 and 3, 24, and 49 for double patenting under 37 CFR 1.75, Applicants have cancelled claims 3 and 24. Applicants have amended claim 49 to depend upon claim 44.

#### **D. 35 U.S.C. §102 Rejections**

20        The Examiner has rejected claims 1, 8-11, 14-16, 20, 22, 27-28, 37 and 40 under 35 U.S.C. § 102(b) as being anticipated by Ehnert. Applicants respectfully disagree. Ehnert employs the use of a filter bag to remove dust and debris from the air as is depicted in Figure 1 and in

Column 2, lines 4-7. An object of the present invention is to avoid the use of filters because they impede air flow and increase the energy required to maintain air circulation within the vacuum. The instant invention makes  
5 use of a centrifugal dust separator for this purpose, which allows air flow to be maintained without impedance while removing dust and debris from the air. As such, Ehnert fails to disclose the "separation means" of claims 1 and 22.

10       Importantly, Ehnert also fails to disclose the toroidal vortex nozzle of claims 1 and 22. Ehnert discloses the use of re-circulated air for the purpose of agitating dust within a carpet at Column 3, lines 59-63. This is not the intent of the present invention. The  
15 toroidal vortex nozzle creates a curved surface across which air follows a smoothly curved path to create a low pressure region. The toroidal vortex nozzle of the present invention must be sealed, preventing air from entering or leaving the system. If the system is not sealed, air  
20 underneath and ahead of the nozzle will be blown away. In a bagless system such as the instant invention, where fine particulates are not spun out of the airflow, but recirculate around the toroidal vortex nozzle, some of the particulates will be returned to the environment. The

Examiner's attention should be drawn to Figure 9 of the present application as an example of a toroidal vortex nozzle. Specifically, Ehnert fails to disclose a surface around which air follows a smoothly curved path to create a low pressure region. Ehnert also fails to provide means for sealing the nozzle such that air neither enters or exits the system. Consequently, Ehnert is not capable of creating a toroidal vortex with a sealed system as in the present invention. Moreover, Ehnert does not disclose every element of claims 1 and 22 or the desired functionality thereof. Thus, Ehnert does not anticipate or make obvious the matter disclosed in claims 1 or 22. Claims 8-11, 14-16, 22, 27-28, 37 and 40 are dependent on claims 1 and 22 and therefore, contain all of the limitations thereof. Thus, these claims are also not anticipated by or obvious in light of Ehnert.

Also, the Examiner has rejected claims 1, 8-11, 14-21, 42, 46, 48 and 53 as being anticipated by McCord. Applicants respectfully disagree. McCord fails to disclose a toroidal vortex nozzle as required by claims 1 and 42. Specifically, McCord provides a nozzle with blowing openings and suction openings for the agitation of dust along the surface to be cleaned. In contrast, the Examiner's attention is directed to Figure 9 of the instant

application as an example of a toroidal vortex nozzle,  
which requires a surface along which air follows a smoothly  
curved path, created by the Coanda effect. The toroidal  
vortex nozzle creates a curved surface across which air  
5 follows a smoothly curved path to create a low pressure  
region. The toroidal vortex nozzle of the present  
invention must be sealed, preventing air from entering or  
leaving the system. If the system is not sealed, air  
underneath and ahead of the nozzle will be blown away. In  
10 a bagless system such as the instant invention, where fine  
particulates are not spun out of the airflow, but  
recirculate around the toroidal vortex nozzle, some of the  
particulates will be returned to the environment. McCord  
fails to disclose a toroidal vortex nozzle as McCord does  
15 not provide a surface along which air follows a smoothly  
curved path creating a low pressure region, nor is the  
system described by McCord sealed. Consequently, McCord is  
not capable of creating a toroidal vortex as in the present  
invention. Moreover, McCord does not disclose every  
20 element of claims 1 and 42 or the desired functionality  
thereof. Thus, McCord does not anticipate or make obvious  
the matter disclosed in claims 1 or 42. Claims 8-11, 14-  
21, 46, 48 and 53 are dependent on claims 1 and 22 and  
therefore, contain all of the limitations thereof. Thus,

these claims are also not anticipated by or obvious in light of McCord.

Also, the Examiner has rejected claims 22 and 38-39 under 35 U.S.C. §102(b) as being anticipated by DE661573.

5 Applicants respectfully disagree. DE661573 does not disclose a toroidal vortex nozzle as required by claim 22. Specifically, a toroidal vortex nozzle requires a low pressure region to be created by air following a smoothly curved path. Importantly, the system must be sealed,  
10 preventing air from entering or leaving. The nozzle of DE661573 does not provide a low pressure region through air following a smoothly curved path. As well, the system shown in DE661573 is not sealed, as air can enter and leave the nozzle depicted in Figure 1, k. As such, DE661573 does  
15 not disclose every element of claim 22 or the desired functionality thereof. Thus, DE661573 does not anticipate or make obvious the matter disclosed in claim 22. Claims 38-39 are dependent on claim 22 and therefore, contain all of the limitations thereof. Thus, these claims are also  
20 not anticipated by or obvious in light of DE661573.

#### **E. 35 U.S.C. §103 Rejections**

The Examiner has rejected claims 6 and 12 under 35 U.S.C. §103(a) as being unpatentable over Enhert. Further, the Examiner rejected claims 2-3 and 23-24 under 35 U.S.C.

§ 103(a) as being unpatentable over Ehnert in view of Self. Also, the Examiner has rejected claims 4-5 and 25-26 under 35 U.S.C. §103(a) as being unpatentable over Ehnert in view of Takemoto. As well, claims 7 and 13 have been rejected  
5 under 35 U.S.C. §103(a) as being unpatentable over Ehnert in view of CA972510. Furthermore, claims 29-31 and 34-36 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Ehnert in view of Inoue et al. Additionally, claim 41 has been rejected under 35 U.S.C.  
10 §103(a) as being unpatentable over Ehnert in view of McCord. Applicants respectfully disagree. Applicants have previously argued that Ehnert does not provide a "toroidal vortex nozzle" as is taught in independent claims 1, 22 and 42. Self is cited by the Examiner for indicating the use  
15 of a vented nozzle. The Examiner cites Takemoto for indicating the use of a rotating brush. CA972510 is cited for use of a hinged nozzle configuration. The Examiner cites Inoue et al. for disclosing an upright-style vacuum housing having a hose for connection between the nozzle and  
20 the housing. McCord is cited for use of a coarse mesh trap.

Applicants have already illustrated in previous arguments how claims 1, 22 and 42 are not anticipated by or made obvious in light of Ehnert. Furthermore, none of

these prior art references used in combination with Enhert disclose "a toroidal vortex nozzle" as disclosed in claims 1, 22 or 42. Thus, no combination of Enhert, Self, Takemoto, Inoue et al., McCord, or knowledge known in the art discloses all of the elements of claims 1, 22 or 42. As such, claims 2-3, 4-5, 6, 7, 12, 13, 23-24, 25-26, 29-31, 34-36 and 41 are in condition for allowance.

As well, claims 12, 44, 47 and 49-52 have been rejected under 35 U.S.C. §103(a) as unpatentable over McCord. Furthermore, claims 2-3 have been rejected under 35 U.S.C. §103(a) as unpatentable over McCord in view of Self. As well, claims 4-5 have been rejected under 35 U.S.C. §103(a) as unpatentable over McCord in view of Takemoto. Also, claims 7, 13 and 45 have been rejected under 35 U.S.C. §103(a) as unpatentable over McCord in view of CA972510. Applicants respectfully disagree with these rejections. Applicants have previously argued that McCord does not provide a "toroidal vortex nozzle" as is taught in independent claims 1, 22 and 42. Self is cited by the Examiner for indicating the use of a vented nozzle. The Examiner cites Takemoto for indicating the use of a rotating brush. CA972510 is cited for use of a hinged nozzle configuration.



Applicants have already illustrated in previous arguments how claims 1, 22 and 42 are not anticipated by or made obvious in light of McCord. Furthermore, none of these prior art references used in combination with McCord  
5 disclose "a toroidal vortex nozzle" as disclosed in claims 1, 22 or 42. Thus, no combination of McCord, Self, Takemoto, CA972510 or knowledge known in the art discloses all of the elements of claims 1, 22 or 42. As such, claims 2-3, 4-5, 7, 12, 13, 44, 45, 47, and 49-52 are in condition  
10 for allowance.

In conclusion, Applicants submit that none of the prior art discloses a "toroidal vortex nozzle" as disclosed in claims 1, 22 or 42. Thus, claims 1, 22 and 42 and the dependent claims are not anticipated or made obvious by any  
15 single prior art reference or any combination thereof.

#### **CONCLUSION**

In view of the foregoing, Applicants respectfully submit that the present invention represents a patentable  
20 contribution to the art, and the application is in condition for allowance. Early and favorable action is accordingly solicited.

Respectfully submitted,

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Jason A. Skinder

Jason A. Skinder  
Reg. No. 47,094  
WARD & OLIVO  
382 Springfield Ave.  
Summit, NJ 07901  
(908) 277-3333